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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P. O. Box 272400
Fort Collins, CO 80527-2400

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NGUYEN, LAM S

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/634,424
Filing Date: August 05, 2003
Appellant(s): SAMII, MOHAMMAD M.

MAILED
OCT 24 2006
GROUP 2800

MOHAMMAD M. SAMMI
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 06/30/2006 appealing from the Office action mailed 02/01/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Maru et al. (US 5877784) (03-1999), Fujii et al. (US 5053789) (10-1991), Sueoka et al. (US 6024439) (02-2000), Tamura et al. (US 4794463) (12-1988), Klaus et al. (US 5396078) (03-1995), Chiu (US 5567063) (10-1996), Kless (US 6357859) (03-2002), and Millman et al. "Microelectronics", Second Edition, McGraw-Hill, Inc, 1987, pp 133-135.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1-4, 10, 13-14, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maru et al. (US 5877784) in view of Fujii et al. (US 5053789).

Referring to claims 1, 23:

Maru et al. discloses a printing apparatus having a printhead assembly comprising:

a plurality of thermal inkjet printing elements (*FIG. 11, element 101*), each of the printing elements configured to cause forming image when the printing element is activated;

a plurality of latches (*FIG. 11, element 104*); and

a plurality of image data receiving units (*FIG. 11: The shift register 105 includes a plurality of S/R cells for receiving and storing image data from the data input 201*) each is coupled to one of the printing elements via one of the latches and a multi-transistor amplifier (*FIG. 11: Each S/R cell is coupled to an associated printing element 101 through an associated latch 104 and an associated dual-transistor amplifier 102*) (**Referring to claims 4, 23**), each configured to generate an activation signal that causes the printing element to be activated when the image data, transmitted from an external device through a wiring connection, is received.

Maru et al., however, does not disclose wherein the plurality of image data receiving units is a plurality of junction photosensors/photodiodes/phototransistors (**Referring to claims 2-3**), each configured to generate an activation signal that causes an associated printing element to be activated when the photosensor is illuminated by a light source and positioned substantially adjacent to the printing element that it is coupled to (**Referring to claim 14**). In other words,

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Maru et al. does not disclose wherein the printhead assembly is in communication with the external device through an optical connection.

Fujii et al. discloses a thermal printing apparatus having a printhead assembly (*FIG. 1, element 3*) that is in data communication with an external device through an optical connection (*FIG. 1*), wherein the printhead assembly including a plurality of junction photosensors, photodiodes (*FIG. 2, element D*), or phototransistors (*FIG. 2: The combination of a diode D and the associated transistor Tr*), each configured to generate an activation signal that causes an associated printing element (*FIG. 2, element H*) to be activated when the photosensor receives optical image data illuminated by a light source (*FIG. 1, element 1*) and positioned substantially adjacent to the ejection element that it is coupled to (*FIG. 1-2, elements 3a-b*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Maru's printing apparatus to include appropriate optical elements so the printhead assembly can be in optical communication with other components rather than by wiring connection and to include a plurality of junction photosensors into the printhead assembly for receiving optical image data rather than the S/R cells as disclosed by Fujii et al. The motivation for doing so would have been well known in the art to avoid many problems due to wiring connection such as disconnection, short circuit, or attenuation (due to resistance of the wiring). *(The applicant please be advised that a suggestion/motivation need not be expressly stated in one or all of the references used to show obviousness, but can be from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference (In re Bozek, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969)).*

Maru et al. also discloses the following claimed invention:

Referring to claim 13: wherein the printhead assembly is a page-wide-array printhead assembly (*column 10, lines 49-55*).

2. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maru et al. (US 5877784) in view of Fujii et al. (US 5053789), as applied to claim 4, and further in view of Millman et al. (Microelectronics, Second Edition, McGraw-Hill, Inc, 1987).

Maru et al., as modified, discloses the claimed invention as discussed above and also discloses wherein each amplifier comprises first and second bipolar junction transistors (BJT) (*FIG. 11, element 102*), a latch (*FIG. 11, element 104*) being coupled to the gate/base of the first transistor of the amplifier, and wherein the second transistor of each amplifier is coupled to the first transistor of the amplifier and to one of the ejection elements (*FIG. 11, element 101*), the second transistor of each amplifier configured to provide a drive signal for activating the ejection element coupled to the second transistor when the first transistor of the amplifier is turned on (*FIG. 11*).

However, Maru et al., as modified, does not disclose wherein the transistors are field effect transistors (FET), each including a gate, a source, and a drain.

Millman et al. teaches that an important feature of field-effect transistors, each including a gate, a source, and a drain (*page 135, fourth paragraph and FIG. 4-3*), is that it is often simpler to fabricate and occupies less than space on a chip than does a BJT in order to increase component density in a very large scale integration (*page 133, second paragraph*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the amplifier disclosed by Mura et al., as modified, to use the

field-effect transistors rather than bipolar junction transistors (BJT) as disclosed by Millman et al. The motivation for doing so would have been because it is simpler to fabricate and occupies less than space on a chip, so it is able to increase component density to build a very large scale integration as taught by Millman et al. (*page 133, second paragraph*).

3. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maru et al. (US 5877784) in view of Fujii et al. (US 5053789), as applied to claim 1, and further in view of Sueoka et al. (US 6024439).

Maru et al., as modified, discloses the claimed invention as discussed above except wherein the plurality of ejection elements are organized into four page-wide-arrays of ejection elements and wherein the ejection elements are piezoelectric inkjet element.

Sueoka et al. discloses a printing apparatus having a printhead assembly including a plurality of ejection elements that are either thermal ejection elements or piezoelectric ejection elements (*column 9, lines 7-15*) and organized into four page-wide-arrays of ejection elements (*FIG. 10, elements 10B, 10M, 10Y, 10C*) for respectively ejecting four color inks.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the printhead assembly disclosed by Maru et al., as modified, to organize the ejection elements into four page-wide-arrays of ejection elements as disclosed by Sueoka et al. The motivation for doing so would have been able to respectively eject four different color inks to form color images as taught by Sueka et al. (*column 8, lines 15-25*).

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maru et al. (US 5877784) in view of Fujii et al. (US 5053789), as applied to claim 1, and further in view of Tamura et al. (US 4794463).

Maru et al., as modified, discloses the claimed invention as discussed above except wherein the plurality of printhead fluid ejection elements is formed on a glass substrate.

Tamura et al. discloses an ink jet system having a printhead assembly including a plurality of printing elements that are formed on a glass substrate (*column 19, line 64 to column 20, line 13*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the printhead assembly disclosed by Maru et al., as modified, to form printing elements on a glass substrate as disclosed by Tamura et al. The motivation for doing so would have been to ensure the insulation for the ink jet head as taught by Tamura et al. (*column 4, lines 5-10*).

(10) Response to Argument

- **Responding to the Appellant's argument regarding to Rejection of claims 1-4, 10, 13, and 14 under 35 U.S.C. §103(a) as being unpatentable over Maru in view of Fujii.**

The Appellant argued that there was no suggestion in this case to combine Maru and Fujii in a manner that would produce the claimed invention, no teaching or suggestion in Maru that it would be advantageous or desirable to replace the shift register 105 disclosed therein with photodiodes, such as the photodiodes D disclosed in Fujii, and no teaching or suggestion in Fujii that it would be advantageous or desirable to replace a shift register with the photodiodes D disclosed therein. The Examiner, in response, cites that "*a suggestion/motivation need not be expressly stated in one or all of the references used to show obviousness, but can be from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference*" (*In re Bozek*, 416 F.2d 1385, 1390, 163

USPQ 545, 549 (CCPA 1969)). In this case, the motivation of replacing Maru's shift register with Fujii's photodiodes to be able to wirelessly communicate between the printhead assembly and the printing apparatus rather than wiring communication has been held well known in the art to avoid many problems due to wiring connection such as wiring disconnection (between a moving printhead assembly and a stationary printing apparatus), short circuit between the conductor wiring, signal attenuation (due to resistance of the wiring), and to eliminate interference noises generated by the electrical wiring.

The Appellant, in addition, asserted that the combination would change the principle of operation of the prior art. The examiner disagrees with the applicant's assertion because one of ordinary skill in the art would know that in order to replace a wiring connection by a wireless connection such as optical communication, optical receivers such as photosensors are needed for converting optical signal to electrical signal. This modification does not change the principle of operation of the printhead that converts electrical signals representing image data to printed images on a printing medium, the modification in fact just changes means for transmitting and receiving image data.

In order to support the Examiner's point of view, the Examiner cites the following references:

Klaus et al. (US 5396078) teaches a printer featuring an optical data link (wireless connection) between the printer's controller and a carriage-mounted printhead to eliminate the need for a flexible ribbon cable (wire connection) that generates interference noises such as RFI (radio-frequency interference), EMI (electromagnetic interference), and ESD (electrostatic discharge) (*Abstract; Column 1, lines 8-11, lines 19-25, lines 50-56*).

Chiu (US 5567063) teaches a wireless data transfer means such as optical means, infra-red, electro-magnetic coupling, or microwave transmissions (*column 2, lines 20-25*) to eliminate the need for any cable interconnecting a printhead with a main printer controller (*column 1, lines 59-61*) because the cable interconnecting is easily break and subject to noise interference (*column 1, lines 50-55*).

Kless (US 6357859) teaches a printing apparatus in which “image forming data is transmitted from the light source to the print head by means of the light beam, thereby removing high frequency electronic signals from any interconnecting flexible multiconductor electrical cable which would otherwise emit undesirable high frequency electromagnetic radiation harmful to operation of any nearby electronic devices” (*column 2, lines 30-37*).

Therefore, the Examiner’s position that replacing Maru’s wired communication with Fujii’s photoelectric communication would have been obvious for the reasons repeated cited by the Examiner as well as for the well-known reasons evidenced by these three citations.

• **Responding to the Appellant’s argument regarding to Rejection of claim 23 under 35 U.S.C. §103(a) as being unpatentable over Maru in view of Fujii.**

The Appellant asserted that Maru and Fujii either alone or in combination did not teach or suggest a junction photosensor coupled to an ejection element via a latch and a multi-transistor amplifier. The Examiner disagrees with the Appellant’s assertion because Maru and Fujii in combination would teach a junction photosensor (*Fujii’s element D*) coupled to an ejection element (*Maru et al.’s elements 101*) via a latch (*Maru et al.’s elements 104*) and a multi-transistor amplifier (*Maru et al.’s elements 102*) by replacing Maru et al.’s shift register (*105*) with Fujii’s junction photosensors (*D*).

- **Responding to the Appellant's argument regarding to Rejection of claims 5-8 under 35 U.S.C. §103(a) as being unpatentable over Maru in view of Fujii and Millman.**

The Appellant asserted that Maru and Fujii, either alone, or in combination, did not teach or suggest “a plurality of latches; and a plurality of junction photosensors, each junction photosensor coupled to one of the ejection elements via one of the latches” and Millman also did not teach or suggest this limitation. The Examiner, in response, cites that Maru and Fujii in combination would teach a plurality junction photosensors (*Fujii's element D*) each coupled to an ejection element of a plurality of ejection elements (*Maru et al. 's elements 101*) via a latch of a plurality of latches (*Maru et al. 's elements 104*) through a multi-transistor amplifier of a plurality of amplifiers (*Maru et al. 's elements 102*) by replacing Maru et al.'s shift register (*105*) with Fujii's junction photosensors (*D*).

- **Responding to the Appellant's argument regarding to Rejection of claims 11-12 under 35 U.S.C. §103(a) as being unpatentable over Maru in view of Fujii and Sueoka.**

The Appellant asserted that Maru and Fujii, either alone, or in combination, did not teach or suggest “a plurality of latches; and a plurality of junction photosensors, each junction photosensor coupled to one of the ejection elements via one of the latches” and Sueoka also did not teach or suggest this limitation. The Examiner, in response, cites that Maru and Fujii in combination would teach a plurality junction photosensors (*Fujii's element D*) each coupled to an ejection element of a plurality of ejection elements (*Maru et al. 's elements 101*) via a latch of a plurality of latches (*Maru et al. 's elements 104*) through a multi-transistor amplifier of a plurality of amplifiers (*Maru et al. 's elements 102*) by replacing Maru et al.'s shift register (*105*) with Fujii's junction photosensors (*D*).

• **Responding to the Appellant's argument regarding to Rejection of claim 9 under 35 U.S.C. §103(a) as being unpatentable over Maru in view of Fujii and Tamura**

The Appellant asserted that Maru and Fujii, either alone, or in combination, did not teach or suggest "a plurality of latches; and a plurality of junction photosensors, each junction photosensor coupled to one of the ejection elements via one of the latches" and Tamura also did not teach or suggest this limitation. The Examiner, in response, cites that Maru and Fujii in combination would teach a plurality junction photosensors (*Fujii's element D*) each coupled to an ejection element of a plurality of ejection elements (*Maru et al.'s elements 101*) via a latch of a plurality of latches (*Maru et al.'s elements 104*) through a multi-transistor amplifier of a plurality of amplifiers (*Maru et al.'s elements 102*) by replacing Maru et al.'s shift register (*105*) with Fujii's junction photosensors (*D*).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

LN

09/21/2006

Conferees:


DAVID BLUM

 QAS

STEPHEN MEIER

 LN

LAM NGUYEN


STEPHEN MEIER
SUPERVISORY PATENT EXAMINER